

Risk Management in the Department of Defense

Identifying Risks to be Taken and Risks to be Avoided

MARK D. SCHAEFFER

Since late 1995, the Department of Defense (DoD) has increased its emphasis on risk management. Renewed interest began when the Under Secretary of Defense for Acquisition and Technology (USD[A&T]) issued a memorandum, "Reducing Life-Cycle Costs for New and Fielded Systems," and established the policy and strategy to develop and field affordable weapon systems.¹

CAIV — A Strong Foundation

One of the foundations of the strategy is the concept of "Cost as An Independent Variable" (CAIV). The CAIV concept recognizes that "There are risks to be taken and risks to be avoided. When risks are taken, we will put in place appropriate risk management and contingency plans."

Other simultaneous, ongoing initiatives included acquisition streamlining, a major revision of acquisition policy contained in the DoD 5000-series documents, and emphasis by acquisition officials on equitable sharing of program risk between contractors and the government. These initiatives also increased the emphasis placed on program risk management.

At the same time, the DoD Inspector General (DoDIG) wrote a critical report of risk management in program offices and recommended that DoD take measures to improve existing practices.

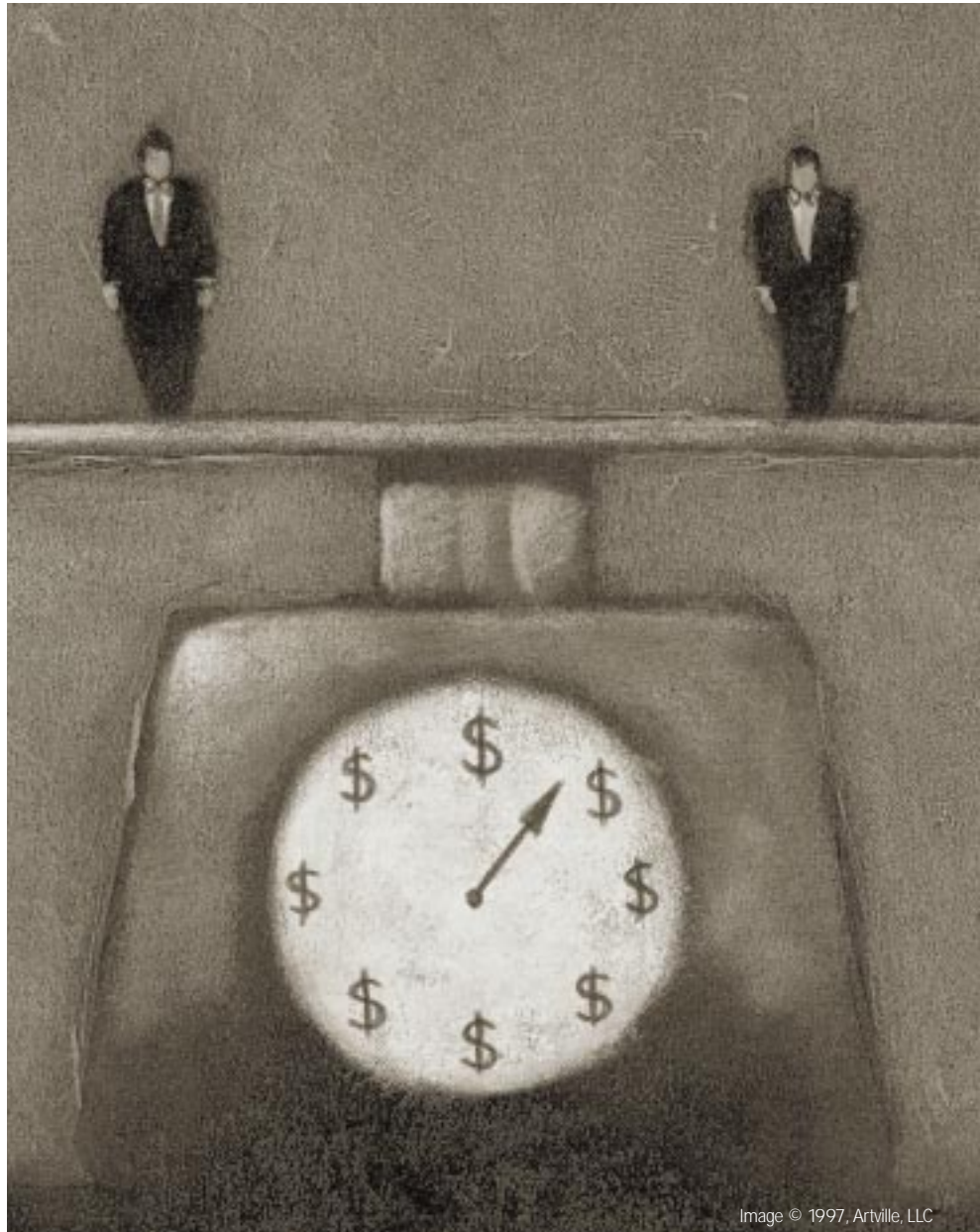


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Schaeffer is the Deputy Director, Systems Engineering, Director, Test, Systems Engineering and Evaluation (DTSE&E), Office of the Under Secretary of Defense for Acquisition and Technology, OSD, The Pentagon, Washington, D.C. Also contributing to the article were Mike Zsak, a member of the DTSE&E Systems Engineering staff; and Louis Simpleman from the Institute for Defense Analyses.

Uncertain about the Department's treatment of risk in this dynamic environment, the USD(A&T) tasked the Director Test, Systems Engineering, and Evaluation (DTSE&E) to review DoD risk management practices and techniques, determine whether DoD needs to identify new approaches to improve risk management, and report the results to USD(A&T).

Within DTSE&E are several Directorates. Our Directorate — Systems Engineering — retains the functional responsibility for DoD risk policy. Therefore, the Director tasked our staff to complete the USD(A&T) assignment. This article tells our experiences in establishing a Risk Management Working Group, our observations and lessons learned, and ultimately our success in recasting the

primary aspects of risk management in the DoD acquisition process.

Risk Management Working Group Established

In response to DTSE&E's tasking, we established a Risk Management Working Group composed of members of the Systems Engineering staff, the Office of the Secretary of Defense (OSD) staff, representatives from the Services, and members of other DoD agencies involved in systems acquisition.

The Institute for Defense Analyses served as our Working Group's analytical arm. As such, its members reviewed pertinent DoD directives and regulations, examined how the Services managed risk, studied various examples of risk management by companies in commercial

industry, and looked at DoD training and education activities in risk management.

Our Working Group also coordinated with other DoD-related efforts. For example, the ongoing efforts of the Joint Aeronautical Commanders Group in the area of risk management provided valuable information. Workshops for the CAIV flagship programs provided our Working Group current, real-world examples of how program managers can implement the CAIV initiative and risk management programs.

Further, we worked closely with managers of ongoing software efforts to ensure the overall risk management strategy also included software risks. Still other information sources included the Open Systems Joint Task Force, Safety, and Cost Estimating communities.

DTSE&E subsequently summarized the findings of our investigation, and in July 1996 presented the results and recommendations to the Defense Manufacturing Council (DMC) [now the Defense Systems Affordability Council (DSAC)], an advisory body to USD(A&T), chaired by [then] Principal Deputy Under Secretary of Defense for Acquisition and Technology, R. Noel Longuemare. This body directed DTSE&E to add guidance in the Defense Acquisition Deskbook (DAD) for implementing the policy in DoD Directive 5000.1 and DoD Regulation 5000.2-R.

Insights and Observations

Based on a thorough review of the new acquisition policy documents, our Working Group determined that DoD Directive 5000.1 and DoD Regulation 5000.2-R contain strong statements on risk management; however, they do not stress the concept that risk assessments should continually address possible future problems. A 1986 Government Accounting Office report on risk management² and a DoDIG audit report, "Risk Management for Defense Acquisition Systems,"³ both recognize this need.

After visiting several program offices, our Working Group made a number of ob-

LAYING THE GROUNDWORK FOR THE RISK MANAGEMENT WORKING GROUP: PICTURED FROM LEFT: MIKE ZSAK, SYSTEMS ENGINEERING DIRECTORATE, DTSE&E, USD(A&T); MARK D. SCHAEFFER, DEPUTY DIRECTOR, SYSTEMS ENGINEERING, DTSE&E, USD(A&T); LOUIS SIMPLEMAN, INSTITUTE FOR DEFENSE ANALYSES.



Photo courtesy IDA

Risk has two components, likelihood and consequences, that determine its potential impact on a program. This idea conveys the need to evaluate both factors before determining the necessity for mitigating action.

servations and evaluations that identify impediments to sound risk management:

Forward Thinking. If program managers are looking toward the future, in all probability they will work to prevent problems, thereby reducing risk, rather than resolving problems through crisis management.

Reporting Risk at Decision Mile-stone. Clearly, some program managers assessed program risk only before a milestone review. They were not using the information gained from their risk assessments in their program management strategy.

New Publications Include Only Mandatory Information. In the revision of DoD Directive 5000.1 and DoD Regulation 5000.2-R, DoD did not include nonmandatory implementation guidance for risk management such as formats for reports and direction on what should be included in a risk assessment.

For example, the “Integrated Program Summary” Risk Assessment format – Annex D of the superseded DoD Manual 5000.2M – is no longer required, and it should not be, given that the new publications include only mandatory information. However, reporting risk at decision milestone remains an integral part of the program approval process, and many program managers still refer to the old DoD 5000.2-M as a guide for reporting risk data.

Our Working Group recognized the need for this type of information and suggested that the new policy documents be augmented in the Defense Acquisition Deskbook to assist program managers in this area.

Lack of Conformity in Approaches to Risk Management Among the Services. As one might expect, our Working Group found that the Services vary in their treatment of risk. Furthermore, within each Service, program offices had different approaches. Although nothing is wrong with this, and OSD does not expect a standard approach, our review of literature and risk programs in DoD and industry revealed that good risk

management programs contain certain common elements.

Such programs have structure, are formal and proactive, and everyone associated with the program considers risk management to be a normal part of his or her job. Moreover, our Working Group believed that because these characteristics are so important, the design of all risk management programs should include some type of formal structure, even though individual approaches will vary.

Industry Participation in Risk Management. Our review of industry proved very interesting. We concentrated on commercial companies, since we had a sufficient look at defense contractors through the review of government program offices.

Overall, the companies that shared information with our Working Group are concerned about risk because failure to meet schedules or develop a product within a planned budget could seriously affect their opportunities for profit.

Generally, commercial companies focus on getting products to market, on time, at a competitive cost. Consider the importance of an air conditioner manufacturer ensuring its new products are ready for sale in the spring. Failure to do so may result in lost sales.

Imagine the impact on the profits of an automobile company that failed to meet its planned date for introduction of a new model and lost its market share to a competitor.

Likewise, pharmaceutical companies have seven years after earning a patent for a product to recoup their investment. During this time they must complete testing, gain Federal Drug Administration approval, and market, manufacture, and sell their products.

We found that the companies that worked with us have both informal and formal structured risk management approaches to help them meet their objectives. Informal approaches use management information and planning sys-

tems, such as an integrated master scheduling software program, to collect data and evaluate a program’s status.

Companies using a structured process are remarkably similar to DoD; they have milestones, program reviews, exit criteria, and performance thresholds. With the exception of the review names and participants’ titles, the formal processes are virtually identical to the DoD acquisition process. These companies also stress the importance of being prospective in nature, and regard as undesirable a management approach that seeks solutions after risk events occur, i.e., crisis management.

Primarily, companies handle risk by using evolutionary approaches to product development. They rely heavily on past experience and are reluctant to pursue development of a product in an area in which they lack expertise. This practice gives them a workforce familiar with the processes that will be required to develop and manufacture the product, and a historical database from which to draw lessons learned. Experience and historical information are big factors in their ability to manage risk.

In addition, our Working Group found that commercial companies used the same basic risk management practices and techniques available to government program managers – there is no new or magic formula for risk management used by commercial industry.

Importance of IPPDs. One common characteristic that DoD programs and industry share is the adoption of the Integrated Product and Process Development (IPPD) concept, a concept previously endorsed as an important initiative of USD(A&T)’s acquisition reform efforts. IPPD promotes information sharing and broad-based planning, which constitute the basis for members of the program offices, the system developer, and the procuring agencies to assess and monitor program risk.

Recognizing that successful implementation of the IPPD concept is critical to conducting an effective and continuous

risk management process, our Working Group identified in the study findings, a need to emphasize the relationship between Risk Management and IPPD as a key management tenet.

Test and Evaluation Program. Industry and government also agree that a thorough test and evaluation program is vital to risk management. Through the test process, managers obtain the data to measure how well the program is handling its risk.

Software Risk Management. In the past, program managers tended to treat software risk management as unique. Our Working Group, which included soft-

ware experts, verified that the software risk management process is the same as that used in the management of other technical risks. Techniques that apply to hardware systems also apply to software-intensive programs.

Risk Management Training. Our Working Group also focused on how well DoD is training acquisition professionals on the subject of risk management, and concluded that the Defense Acquisition University (DAU) and its consortium schools needed to include in their curricula, increased training on how program offices should apply sound risk management principles.

At the request of DTSE&E, the DAU and DSMC group members used material from the study to upgrade their teaching notes, and created new risk man-

agement lesson modules. After a thorough review by our Working Group and approval by the Technical Management Functional Board,⁴ DAU incorporated the new modules in its applicable course curricula.

DTSE&E will continue to use our Risk Management Working Group as the focal point to keep risk-related information in the DAD current, and, in turn, ensure that the information taught in the various courses is up-to-date.

Sharing Information Following the guidance of the DMC [DSAC], we summarized our study results in Section 2.5.2 of the DAD. The

DAD includes a general section that presents an overview of DoD's concept of risk, a list of risk-related definitions, and describes a structure (to the left) as depicted in the chart for managing risk.

Other sections discuss risk and the acquisition process, program management and risk management, and management tools and techniques. Except for the mandatory sources, which are labeled as such, guidance in the DAD is discretionary; however, the information is useful to anyone interested in developing a risk management program.

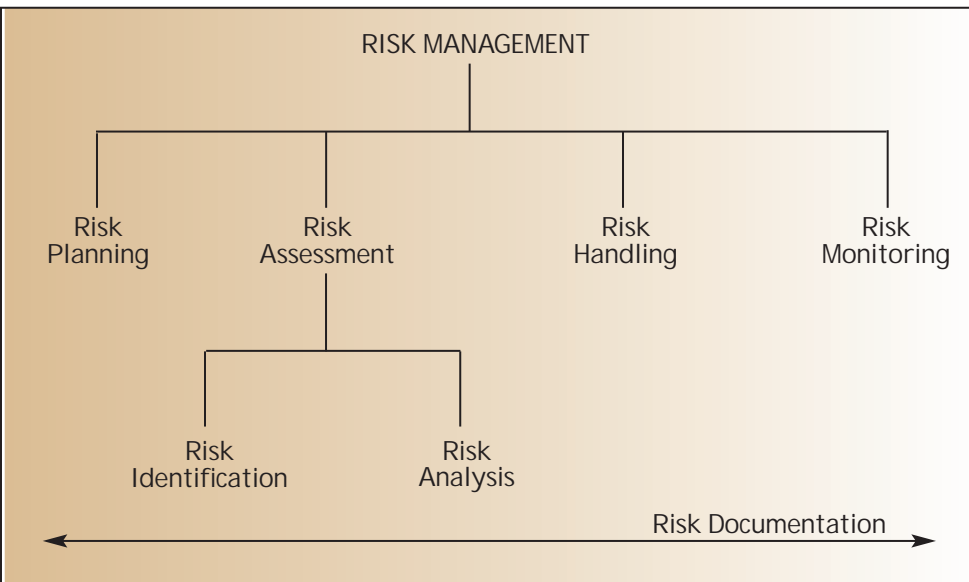
No need exists to expand on the information in the DAD since it is available to everyone via the World Wide Web, but several points covered in the Deskbook are important and deserve emphasis.

Likelihood and Consequences. First is the concept that risk has two components, likelihood and consequences, that determine its potential impact on a program. This idea conveys the need to evaluate both factors before determining the necessity for mitigating action.

For example, there may be a high likelihood of an event happening, but if the consequences are not severe, a program manager may elect to assume the risk and take no mitigating action. Conversely, a program manager may act to control a risk event with a relatively low likelihood of occurring if it has catastrophic consequences.

It is the combination of these attributes that a program manager must analyze to determine the priority for expending resources for mitigation.

DoD Risk Management Structure



ware experts, verified that the software risk management process is the same as that used in the management of other technical risks. Techniques that apply to hardware systems also apply to software-intensive programs.

Software, like other engineering disciplines, has characteristics that can make it difficult to manage. However, when identifying and assessing areas that might adversely impact their programs, program managers must include hardware and software events, develop mitigation plans for risk areas, and monitor the risk handling activities. It is, in fact, a systems approach to managing risk, and for that reason DTSE&E expects that software

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areas, usually a reasonable number, handling those areas that could be most damaging becomes more probable. Program managers must focus on the critical high- and moderate-risk areas rather than expending resources on low areas.

Moreover, because of affordability constraints on today's programs, program managers can no longer afford to attempt to buy down all risks. In some cases, they cannot afford to spend scarce development dollars on high-performance, high-risk objectives.

Structured Process. Finally, a good risk management program includes the processes of planning, assessing (which includes identification and analyses), developing handling actions, monitoring (which is done through collecting normal programmatic, test, and evaluation data), and documenting all aspects of the risk program.

As discussed previously in this article, our Working Group agreed on the importance of a structured process (as described in the DAD) as characteristic of good risk management in government as well as industry. Programs may vary in form; however, sound risk management processes include these structured processes.

DTSE&E Role

Our role with regard to risk management in the acquisition process is well defined. Based on our charter, the Systems Engineering Directorate will –

- support the system assessment process with personnel resources and technical expertise to assess programs' treatment of risk and advise decision makers accordingly;
- serve as the focal point for Engineering and Test policy coordination and guidance, to ensure that DoD risk-related policy is current and relevant;
- assist, as necessary, in the development of tools, techniques, and

processes to support risk management in the acquisition process;

- ensure that technical career training adequately addresses the subject of risk management; and
- support the applicable committees within DoD and industry on risk-related matters.

Our intent is to serve as the focal point for the exchange of all risk-related information for DoD and the Defense industry. Ultimately, our goal is to provide program managers with information that will help them manage program risk.

Toward that end, we plan to update risk-related documents, where necessary, and to search government and industry sources for tools, techniques, and metrics that will assist program managers. We will update the DAD, based on feedback from users and as information becomes available from our research. For information that is not appropriate for the DAD, we have a World Wide Web site.

Moreover, the Risk Management Working Group will continue to meet to exchange information and serve as the conduit for sharing information with the Services. In addition, we are evaluating the need for a stand-alone course in risk management to ensure that acquisition professionals are adequately trained.

Finally, we will continue to work within DoD and with other government agencies, industry, and academia to advance the state of the practice of risk management.

Recasting Risk Management

Several important actions resulted from our study of Risk Management.

- In recasting the important aspects of risk management, we changed DoD's approach to sound risk management from one that required program managers to periodically *examine and report* program risk, to an approach that emphasizes the need for everyone associated with a program to *continuously manage risk*.

- In the DAD, we provide definitions and a structure for a risk management program that reflect current DoD, industry, and academia best practices.

- For the day-to-day management of risk, the DAD also describes the latest tools and techniques used by successful program managers.

- We are continually updating the risk management material in DAU courses to ensure that what we teach students reflects current practices.

In the future, we will build on the experience and knowledge of DoD acquisition professionals, industry, and academia to give managers the tools they need to successfully manage risk in their programs.

Program managers will always have the job of managing program risks. Our goal is to ensure that they have the necessary tools to do that job in the most effective and efficient way possible.

ENDNOTES

1. "Reducing Life-Cycle Costs for New and Fielded Systems," Memorandum (USD[A&T]), December 4, 1995).

2. *Technical Risk Assessment: The Status of Current DoD Efforts*, PEMD-86-5 (GAO, Washington, D.C., April 1986).

3. "Risk Management for Defense Acquisition Systems," Report 96-162 (DoDIG, March 22, 1996).

4. The Technical Management Functional Board is composed of experts in appropriate technical areas and is responsible for setting the technical content for courses such as; Systems Planning, Research, Development, and Engineering; Acquisition Logistics; Production and Quality Management; and Test and Evaluation. Since lessons cover only several hours in each of the courses, the Risk Management Working Group is presently reviewing the need for a dedicated risk management course.